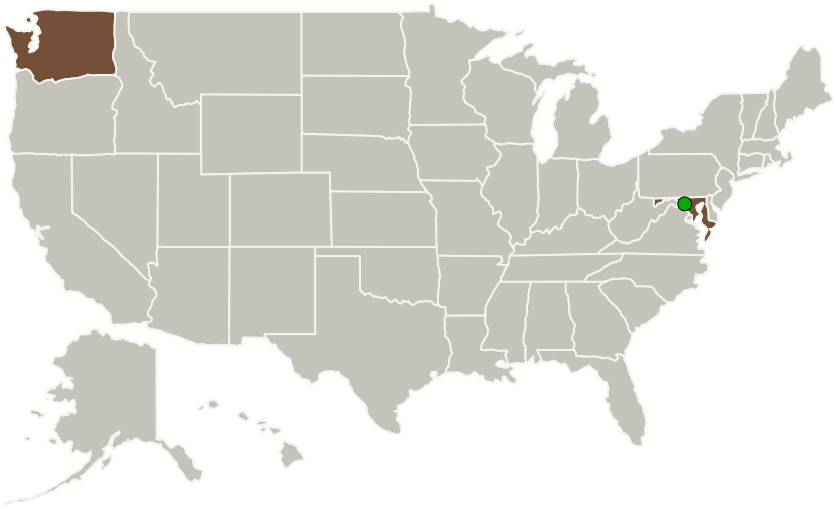
RF Crosslink for Relative Navigation and Time/Frequency Distribution, Phase II

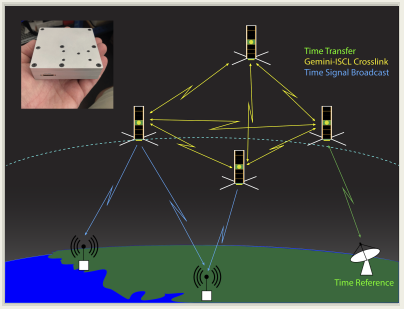
Completed Technology Project (2017 - 2019)

Project Introduction

M42 Technologies is proposing to continue development of a RF based crosslink with relative navigation and time transfer capabilities to enable autonomous precision formation flying (PFF) of spacecraft as small as nanosatellites (1 to 10 kg). The solution consists of a multi-channel software defined radio (SDR), and innovative signaling and processing to enable CubeSat scaled spacecraft to measure positions with centimeter to sub-millimeter-level precision positioning (Technical Area (TA) 5.4.4) thereby providing new capabilities such as autonomous rendezvous and docking (AR&D), and precision formation flying (PFF) both for human and robotic exploration missions. In addition, this proposed solution provides for inter-satellite nanosecond-level time transfer capability (TA 5.4.1) improving absolute navigation. This proposed effort will build on the demonstrated results of the Phase I SBIR, and will focus on improving performance, developing and delivering a prototype CubeSat-scaled radiometric SDR-based navigation solution that with autonomous position, navigation and time (PNT) capabilities.

Primary U.S. Work Locations and Key Partners





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Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
M42 Technologies, LLC	Lead Organization	Industry	Seattle, Washington
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Washington

Project Transitions

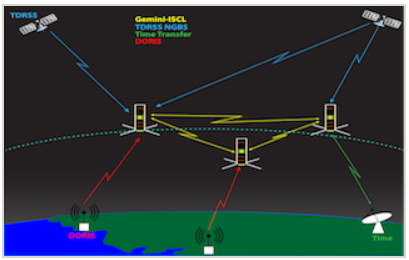
June 2017: Project Start

October 2019: Closed out

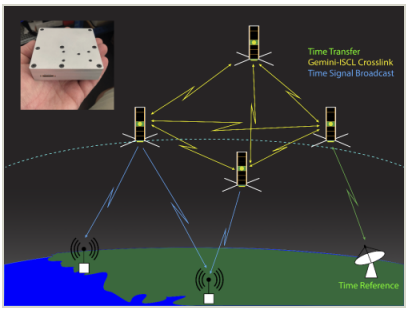
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140892)*

Images



Briefing Chart Image
RF Crosslink for Relative Navigation and Time/Frequency Distribution, Phase II Briefing Chart Image *(https://techport.nasa.gov/image/130438)*



Final Summary Chart Image
RF Crosslink for Relative Navigation and Time/Frequency Distribution, Phase II
(https://techport.nasa.gov/image/135359)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
M42 Technologies, LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

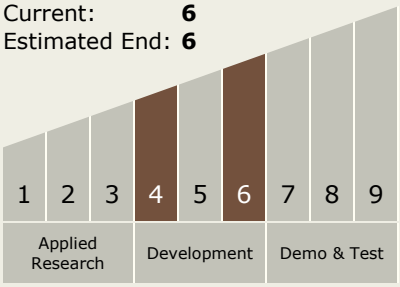
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Nestor Voronka

Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



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Completed Technology Project (2017 - 2019)

Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
  - TX17.2 Navigation Technologies
    - TX17.2.3 Navigation Sensors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System